AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of determining the concavity and convexity on a sample, comprising the steps of:

scanning a portion of a sample including a convex pattern formed thereon with a charged particle beam~~; and~~

forming a profile waveform based on a charged particle emitted from ~~a location of said sample that has been~~ the scanned portion of the sample;

detecting a peak in the formed profile waveform;

comparing a convergence of a foot portion of each peak on either side thereof in the detected profile waveform;

determining when the ~~said profile waveform comprising a peak, wherein, when one~~ foot portion on one side of said peak converges more gradually than the ~~other~~ foot portion ~~thereof~~ on the other side, that a portion of said sample corresponding to ~~said one foot portion is determined~~ a non-peak portion of the profile waveform which is continuous from the foot portion on the one side to be a convex portion, and that a portion of the sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the other side is a concave portion.

2. (Currently Amended) A method of determining the concavity and convexity on a sample, comprising the steps of:

scanning a portion of a sample including a concave pattern formed thereon with a charged particle beam~~; and~~

forming a profile waveform based on a charged particle emitted from ~~a location of said sample that has been~~ the scanned portion of the sample;

detecting a peak in the formed profile waveform;

comparing a convergence of a foot portion of each peak on either side thereof in the detected profile waveform;

determining when the ~~said profile waveform comprising a peak, wherein, when one~~ foot portion on one side of said peak converges more steeply than the other foot portion ~~thereof~~ on the other side, that a portion of said sample corresponding to ~~said one foot portion is determined to be~~ a non-peak portion of the profile waveform which is continuous from the foot portion on the one side is a concave portion, and that a portion of the sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the other side is a convex portion.

3. (Original) The method of determining the concavity and convexity on a sample according to claim 1 or 2, wherein the charged particle beam is incident on the plane of a substrate perpendicularly.

4. (Original) The method of determining the concavity and convexity on a sample according to claim 3, wherein said profile waveform is created based on a charged particle emitted from a location of said sample that has been scanned as the charged particle beam that is perpendicularly incident on the sample is scanned by a scanning deflector.

5. (Original) The pattern position detection method according to claim 1 or 2, wherein the position of a pattern on said sample is identified based on the information about the concave and/or convex portions that have been determined.

6. (Original) The pattern position detection method according to claim 1 or 2, wherein a convex-concave pattern formed on a substrate is scanned by a charged particle beam, a profile waveform is created based on a reflected or secondary charged particle emitted from a scanned location, and a specific position of said pattern on said substrate is detected based on pattern convex-concave information obtained by said method of determining the concavity and convexity on a sample.

7. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with concavity-convexity information about a pre-registered model, in order to detect a specific position on said pattern on said sample.

8. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with the profile shape of a pre-registered model, and an error is detected if an evaluation value indicating the difference in their profile shapes exceeds a predetermined value.

9. (Original) The pattern position detection method according to claim 6, wherein a comparison is made with the number of edges in a pre-registered model, and an error is detected if the numbers of edges exceed a predetermined value.

10. (Currently Amended) A method of determining the concavity and convexity on a sample, comprising the steps of:

scanning a portion of a sample comprising a convex and/or concave pattern formed thereon with a charged particle beam[[,]];

forming a profile waveform based on a charged particle emitted from [[a]] the scanned ~~location~~ portion of the sample; [[, and]]

forming a differentiated waveform of said profile waveform;[[,]]

~~said differentiated waveform having at least two peaks, wherein a portion of said sample corresponding to a longer interval between the position of one of the peaks and a point where the differentiated waveform becomes zero or converges is determined to be a convex portion, and a portion of said sample corresponding to a shorter interval is determined to be a concave portion~~

detecting a pair of continuous positive and negative peaks in the differentiated waveform;

determining, when, for each pair of the continuous positive and negative peaks in the detected differentiated waveform, the interval in a negative peak between a peak position and a position where the differentiated waveform reaches zero or converges is longer than the same interval in a positive peak, that a portion of the sample that corresponds to a non-peak portion of the differentiated waveform where the positive peak converges is a concave portion, and that a portion on the sample that corresponds to a non-peak portion of the differentiated waveform where a negative peak converges is a convex portion relative to the concave portion.

11. (Currently Amended) A charged particle beam apparatus comprising:

a charged particle source,

a scanning deflector for scanning a charged particle beam emitted by said charged particle source, [[and]]

a detector for detecting a charged particle emitted by a sample irradiated by said charged particle beam, ~~wherein the improvement comprises~~ and

a control processor that comprises:

a peak detecting means for forming a profile waveform ~~comprising a peak~~ based on the detected charged particle and detecting a peak in the formed profile waveform; ~~, wherein, when one~~

a comparison means for comparing a convergence of a foot portion of each peak on either side thereof in the detected profile waveform; and ~~of said peak converges more gradually than the other foot portion thereof, a portion of said sample corresponding to said one foot portion is determined by said control processor to be a convex portion~~

a determination means that determines, based on the result of comparison made by the comparing means, when the foot portion on one side converges more gradually than the foot portion on the other side, that a portion of the sample corresponding to a non-peak portion of a differentiated waveform which is continuous from the foot portion on the one side is a convex portion, and that a portion of the sample corresponding to a non-peak portion of the differentiated waveform which is continuous from the foot portion on the other side is a concave portion relative to the convex portion.